

Name: key Date: _____

8.1-8.6 Intervention Acc Geometry

Find the geometric mean between the two numbers.

$$x^2 = \frac{2\sqrt{2}}{5} \cdot \frac{3\sqrt{2}}{5} = \frac{6\sqrt{4}}{25} = \frac{6 \cdot 2}{25} = \frac{12}{25} = \left(\frac{\sqrt{12}}{\sqrt{25}}\right) = \left(\frac{2\sqrt{3}}{5}\right)$$

1. $\frac{2\sqrt{2}}{5}$ and $\frac{3\sqrt{2}}{5}$ $\frac{\frac{2\sqrt{2}}{5}}{x} = \frac{x}{\frac{3\sqrt{2}}{5}}$

2. 3 and 24 $\frac{3}{x} = \frac{x}{24}$ $x^2 = 72$ $x = 6\sqrt{2}$

The geometric mean and one extreme are given. Find the other extreme.

3. $\sqrt{24}$ is the geometric mean between a and b . Find b if $a = 2$. $x^2 = (ab)$ $(\sqrt{24})^2 = 2b$

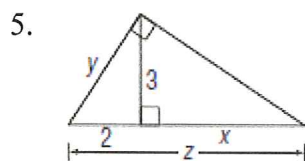
4. $\sqrt{12}$ is the geometric mean between a and b . Find b if $a = 3$.

$$x^2 = (ab) \quad (\sqrt{12})^2 = 3b$$

$$\frac{12}{3} = b$$

$$4 = b$$

Use EXACT values for #5-18 to find EACH variable. For #19-24 round to nearest tenth



Find y

$$3^2 + 2^2 = y^2$$

$$13 = y^2$$

$$\sqrt{13} = y$$

Find x

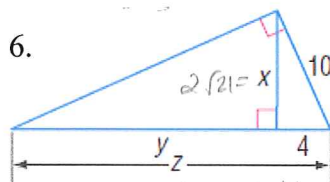
$$\frac{3}{2} = \frac{x}{3}$$

$$x = 4.5$$

$$z = 2 + x$$

$$z = 2 + 4.5$$

$$z = 6.5$$



Find x

$$4^2 + x^2 = 10^2$$

$$16 + x^2 = 100$$

$$x^2 = 84$$

$$x = 2\sqrt{21}$$

Find y

$$\frac{2\sqrt{21}}{4} = \frac{y}{2\sqrt{21}}$$

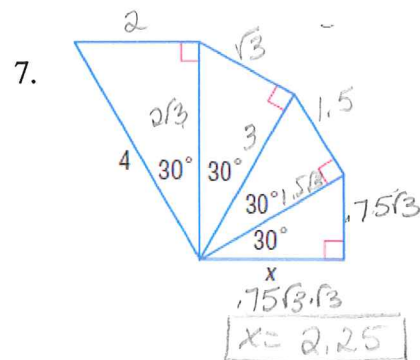
$$4 \cdot \sqrt{441} = 4y$$

$$4 \cdot 21 = 4y$$

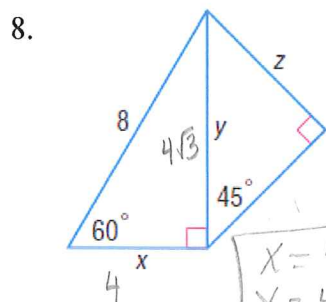
$$21 = y$$

$$z = 21 + 4$$

$$z = 25$$



$$x = 2.25$$



$$x = 4$$

$$y = 4\sqrt{3}$$

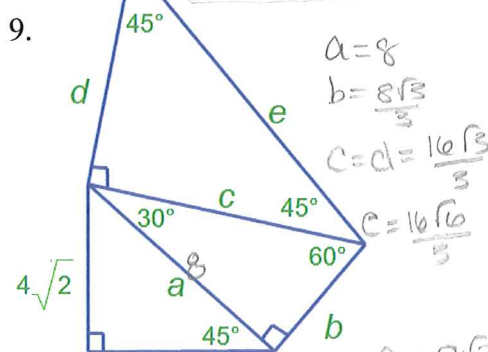
$$z = 2\sqrt{6}$$

$$y = z\sqrt{2}$$

$$4\sqrt{3} = 2\sqrt{2}$$

$$\frac{4\sqrt{3}}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{4\sqrt{6}}{\sqrt{4}} = \frac{4\sqrt{6}}{2}$$

$$z = 2\sqrt{6}$$



$$a = 8$$

$$b = \frac{8\sqrt{3}}{3}$$

$$c = d = \frac{16\sqrt{3}}{3}$$

$$c = \frac{16\sqrt{6}}{3}$$

$$e = c\sqrt{2}$$

$$e = \frac{16\sqrt{3} \cdot \sqrt{2}}{3}$$

$$e = \frac{16\sqrt{6}}{3}$$

$$a = 4\sqrt{2} \cdot \sqrt{2}$$

$$a = 4\sqrt{4} = 4 \cdot 2 = 8 = a$$

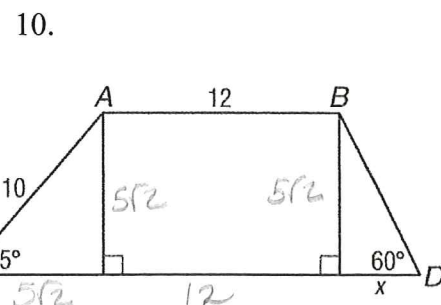
$$8 = b\sqrt{3}$$

$$b = \frac{8\sqrt{3}}{3}$$

$$c = 2(b)$$

$$c = 2 \cdot \frac{8\sqrt{3}}{3}$$

$$c = \frac{16\sqrt{3}}{3} = d$$

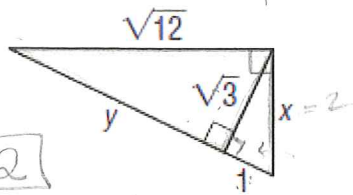


$$5\sqrt{2} = x\sqrt{3}$$

$$\frac{5\sqrt{2}}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{5\sqrt{6}}{3}$$

$$x = \frac{5\sqrt{6}}{3}$$

11.



$$\boxed{x=2}$$

$$(\sqrt{3})^2 + 1^2 = x^2$$

$$3 + 1 = x^2$$

$$4 = x^2$$

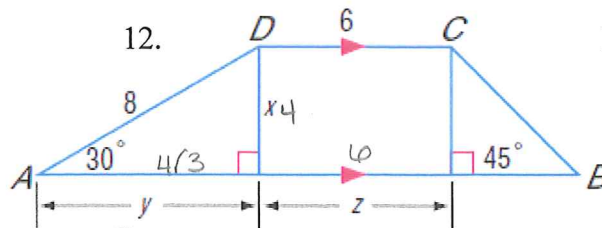
$$\boxed{2 = x}$$

$$\frac{\sqrt{3}}{y} = \frac{1}{\sqrt{3}}$$

$$(\sqrt{3})^2 = y$$

$$\boxed{3 = y}$$

12.



$$x = \frac{8}{2}$$

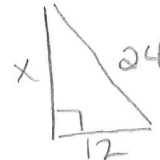
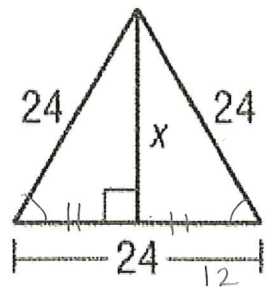
$$\boxed{x=4}$$

$$y = x\sqrt{3}$$

$$\boxed{y=4\sqrt{3}}$$

$$\boxed{z=6}$$

13.

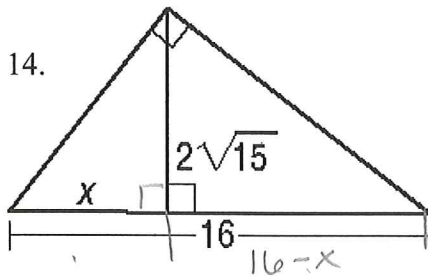


$$12^2 + x^2 = 24^2$$

$$x^2 = 432$$

$$\boxed{x=12\sqrt{3}}$$

14.



$$\frac{2\sqrt{15}}{x} = \frac{16-x}{2\sqrt{15}}$$

$$4 \cdot 15 = 16x - x^2$$

$$60 = 16x - x^2$$

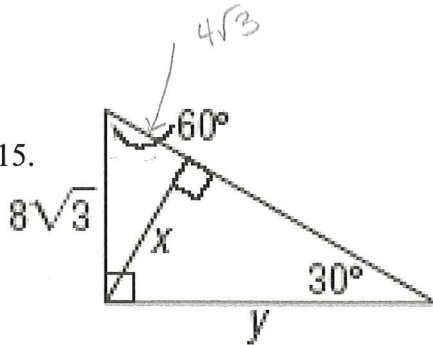
$$x^2 - 16x + 60 = 0$$

$$(x-6)(x-10) = 0$$

$$\boxed{x=6}$$

$$\boxed{x=10}$$

15.



$$x = (4\sqrt{3})\sqrt{3}$$

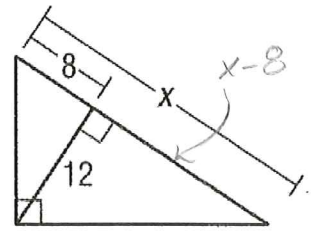
$$x = 4 \cdot 3$$

$$\boxed{x=12}$$

$$y = 2(12)$$

$$\boxed{y=24}$$

16.



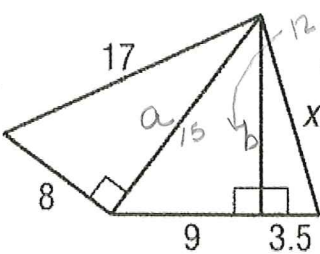
$$\frac{12}{x-8} = \frac{8}{12}$$

$$144 = 8x - 64$$

$$208 = 8x$$

$$\boxed{26 = x}$$

17.



$$8^2 + a^2 = 17^2$$

$$a^2 = 225$$

$$\boxed{a=15}$$

$$a^2 + b^2 = 15^2$$

$$b^2 = 144$$

$$\boxed{b=12}$$

Find x

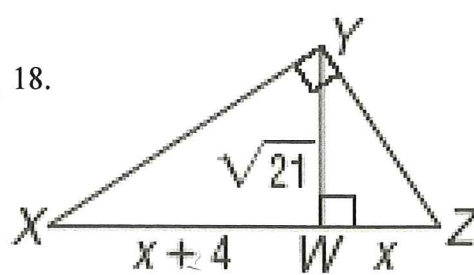
$$12^2 + 3.5^2 = x^2$$

$$\sqrt{156.25} = \sqrt{x^2}$$

$$\boxed{x = \sqrt{156.25}}$$

$$\boxed{x = 12.5}$$

18.



$$\frac{\sqrt{21}}{x+4} = \frac{x}{\sqrt{21}}$$

$$(\sqrt{21})^2 = x(x+4)$$

$$21 = x^2 + 4x$$

$$0 = x^2 + 4x - 21$$

$$0 = (x-3)(x+7)$$

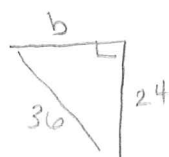
$$\boxed{x=3}$$

$$x+7=0$$

$$x=-7$$

Can't be neg. distance

19.

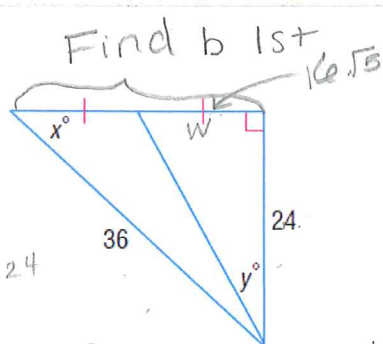


$$24^2 + b^2 = 36^2$$

$$b^2 = 720$$

$$b = 12\sqrt{5}$$

$$w = 6\sqrt{5}$$



$$\sin x = \frac{24}{36}$$

$$x = \sin^{-1}\left(\frac{24}{36}\right)$$

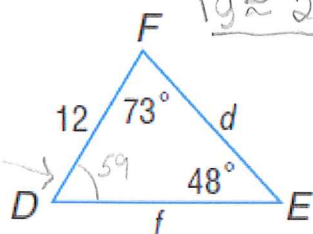
$$x \approx 41.8^\circ$$

$$\tan y = \frac{6\sqrt{5}}{24}$$

$$y = \tan^{-1}\left(\frac{6\sqrt{5}}{24}\right)$$

$$y \approx 29.8^\circ$$

21.

 Δ sum

$$\frac{\sin 59}{d} = \frac{\sin 48}{12}$$

$$\frac{12 \sin 59}{\sin 48} = d$$

$$13.8 \approx d$$

$$\frac{\sin 73}{f} = \frac{\sin 48}{12}$$

$$12 \sin 73 = f \sin 48$$

$$15.4 \approx f$$

23.



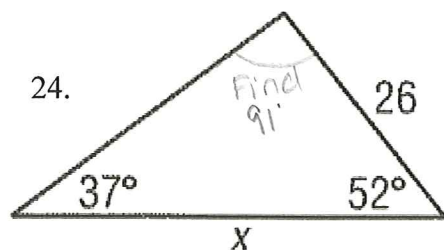
$$\frac{\sin x}{7} = \frac{\sin 23}{15}$$

$$\sin x = \frac{7 \cdot \sin 23}{15}$$

$$x = \sin^{-1}\left(\frac{7 \cdot \sin 23}{15}\right)$$

$$x \approx 16.5^\circ$$

24.

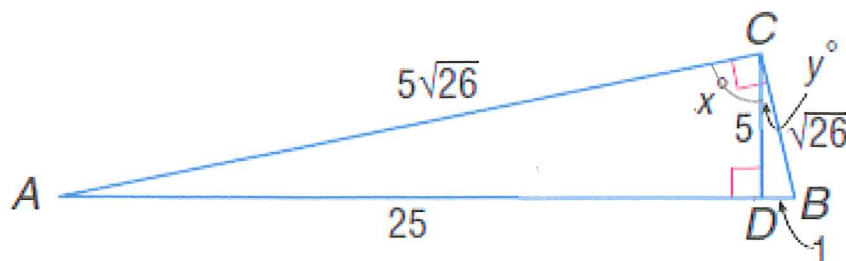


$$\frac{\sin 91}{x} = \frac{\sin 37}{26}$$

$$x = \frac{26 \cdot \sin 91}{\sin 37}$$

$$x \approx 43.2$$

20.



$$\tan x = \frac{25}{5}$$

$$x = \tan^{-1}\left(\frac{25}{5}\right)$$

$$x \approx 78.7^\circ$$

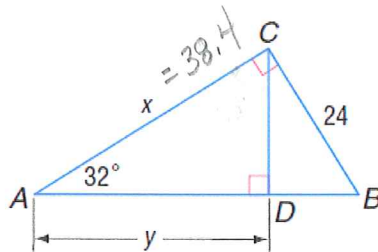
$$\tan y = \frac{1}{5}$$

$$y = \tan^{-1}\left(\frac{1}{5}\right)$$

$$y \approx 11.3^\circ$$

Ask your self if
this makes
sense

22.



Find x use

$$\tan 32 = \frac{24}{x}$$

$$x = \frac{24}{\tan 32}$$

$$x \approx 38.4$$



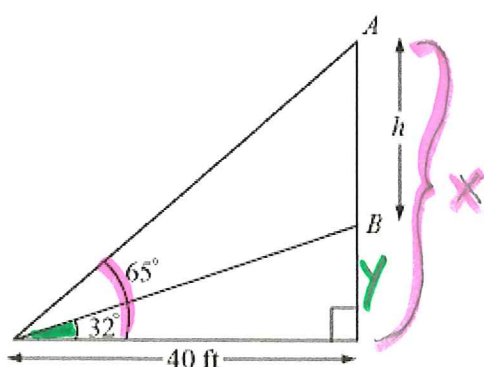
Find y

$$\cos 32 = \frac{y}{38.4}$$

$$38.4 \cdot \cos 32 = y$$

$$32.6 \approx y$$

25. In the figure below, A and B represent the top and the bottom of a large balloon floating directly above the street. Arnold is standing 40 feet from a point on the street directly beneath the balloon. Find the height h of the balloon.

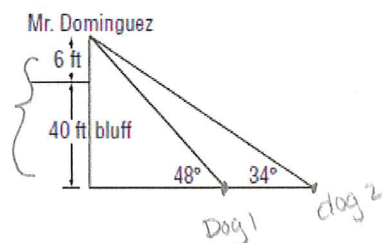


$$\begin{aligned}\tan 65^\circ &= \frac{x}{40} \\ x &\approx 85.8 \text{ ft} \\ x - y &= h \\ 85.8 - 25 &= h\end{aligned}$$

$$\begin{aligned}\tan 32^\circ &= \frac{y}{40} \\ y &\approx 25 \text{ ft}\end{aligned}$$

$$h = 60.8 \text{ ft}$$

26. **INDIRECT MEASUREMENT** Mr. Dominguez is standing on a 40-foot ocean bluff near his home. He can see his two dogs on the beach below. If his line of sight is 6 feet above the ground and the angles of depression to his dogs are 34° and 48° , how far apart are the dogs to the nearest foot?



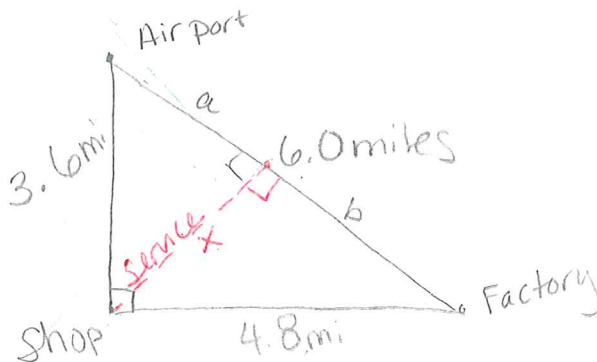
$$\begin{aligned}\tan 48^\circ &= \frac{46}{x} \\ x &\approx 41.4 \text{ ft}\end{aligned}$$

$$\begin{aligned}\tan 34^\circ &= \frac{46}{y} \\ y &\approx 68.2 \text{ ft}\end{aligned}$$

$$\begin{aligned}y - x &= 68.2 - 41.4 \\ \text{The dogs are } 27 \text{ ft away}\end{aligned}$$

27. **CIVIL ENGINEERING** An airport, a factory, and a shopping center are at the vertices of a right triangle formed by three highways. The airport and factory are 6.0 miles apart. Their distances from the shopping center are 3.6 miles and 4.8 miles, respectively. A service road will be constructed from the shopping center to the highway that connects the airport and factory. What is the shortest possible length for the service road? Round to the nearest hundredth.

$$\begin{aligned}\frac{3.6}{a} &= \frac{6.0}{3.6} \\ a &= 2.16 \\ b &= 3.84\end{aligned}$$



$$\begin{array}{c} 6.0, 3.6, 4.8 \\ \hline \text{Hyp.} \quad \text{Legs} \end{array}$$

$$\frac{x}{a} = \frac{b}{x}$$

$$\frac{x}{2.16} = \frac{3.84}{x}$$

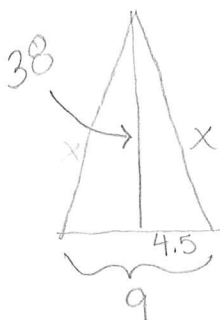
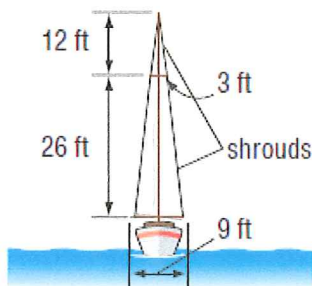
$$x^2 = 8.2944$$

$$x = \sqrt{8.2944}$$

$$x = 2.88 \text{ miles}$$

This is ok because we started with decimals.

28. **SAILING** The mast of a sailboat is supported by wires called *shrouds*. What is the total length of wire needed to form these shrouds?



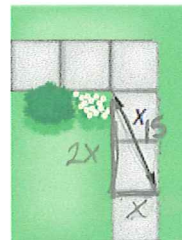
$$x = \sqrt{1464.25}$$

$$2x = 2\sqrt{1464.25}$$

Total wire needed is about 76.53 ft

NO exact value b/c we started w/ a decimal.

29. **LANDSCAPING** Six congruent square stones are arranged in an L-shaped walkway through a garden. If $x = 15$ inches, then find the area of the L-shaped walkway.



x is one side of square

$$(2x)^2 + x^2 = 15^2$$

$$4x^2 + x^2 = 225$$

$$5x^2 = 225$$

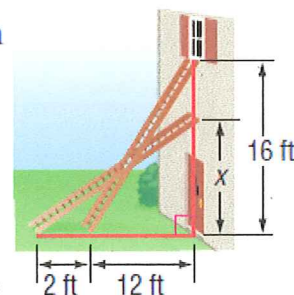
$$x^2 = 45$$

$$x = 3\sqrt{5}$$

$$6A = 6(l \cdot h) = 6(3\sqrt{5} \cdot 3\sqrt{5}) = 6 \cdot 9 \cdot 5$$

$$A = 270 \text{ in}^2$$

30. **PAINTING** A painter sets a ladder up to reach the bottom of a second-story window 16 feet above the ground. The base of the ladder is 12 feet from the house. While the painter mixes the paint, a neighbor's dog bumps the ladder, which moves the base 2 feet farther away from the house. How far up the side of the house does the ladder reach?



$$14^2 + x^2 = 20^2$$

$$x^2 = 204$$

$$x = 2\sqrt{51} \text{ ft}$$

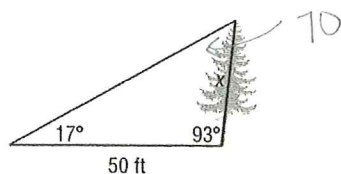


$$\text{Ladder} = 20 \text{ ft}$$

$$12^2 + 16^2 = L^2$$

$$400 = L^2$$

31. A tree grew at a 3° slant from the vertical. At a point 50 feet from the tree, the angle of elevation to the top of the tree is 17° . Find the length of the tree to the nearest tenth of a foot.



$$\frac{\sin 17}{x} = \frac{\sin 70}{50}$$

$$\frac{50 \cdot \sin 17}{\sin 70} = x$$

$$15.6 \text{ ft} = x$$

Not a Right Δ use Law of Sines.

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1. $\frac{2\sqrt{2}}{5}$ and $\frac{3\sqrt{2}}{5}$

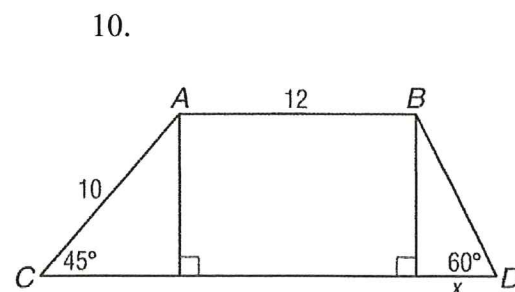
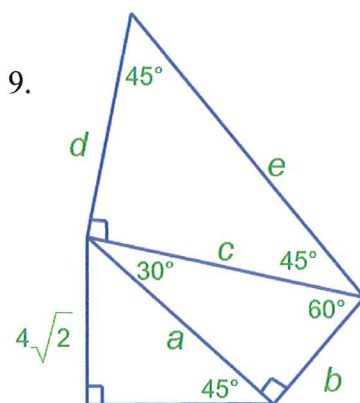
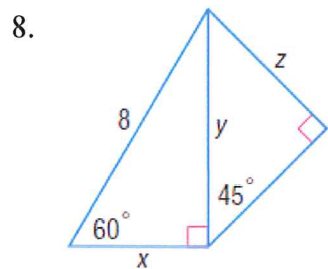
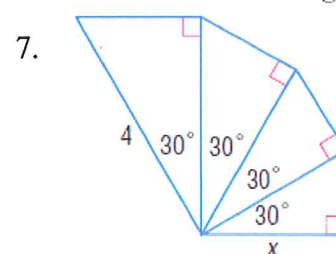
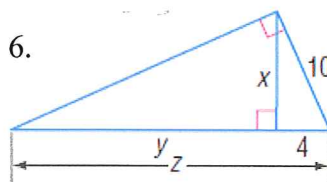
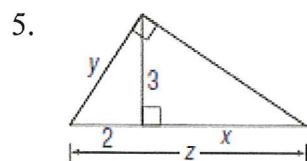
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The geometric mean and one extreme are given. Find the other extreme.

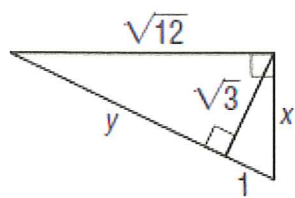
3. $\sqrt{24}$ is the geometric mean between a and b . Find b if $a = 2$.

4. $\sqrt{12}$ is the geometric mean between a and b . Find b if $a = 3$.

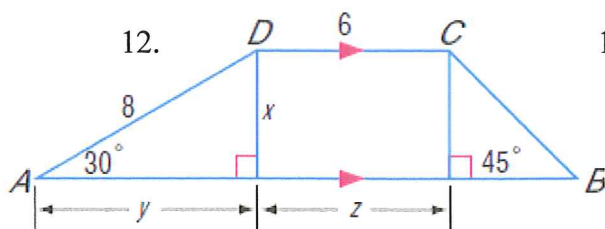
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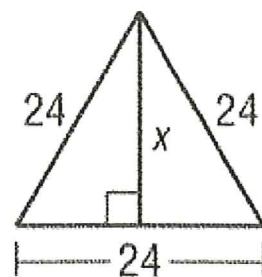
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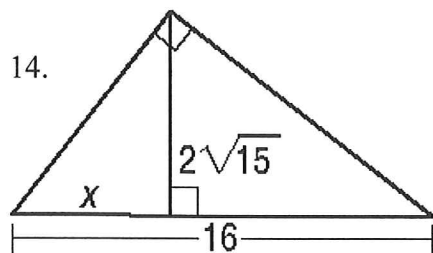
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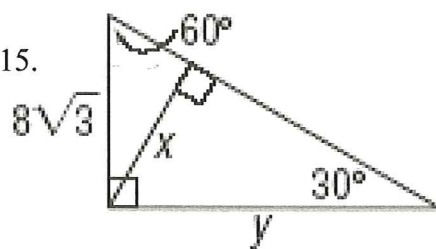
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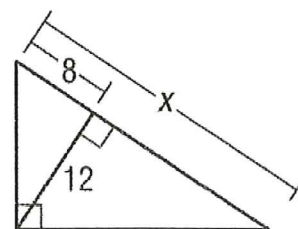
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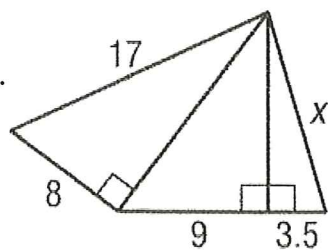
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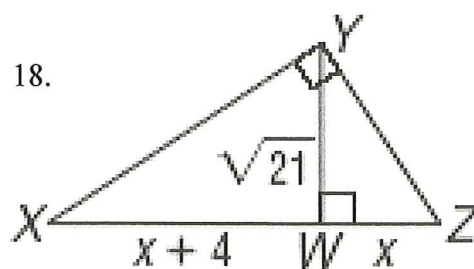
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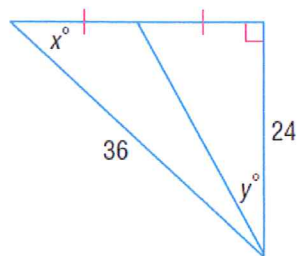
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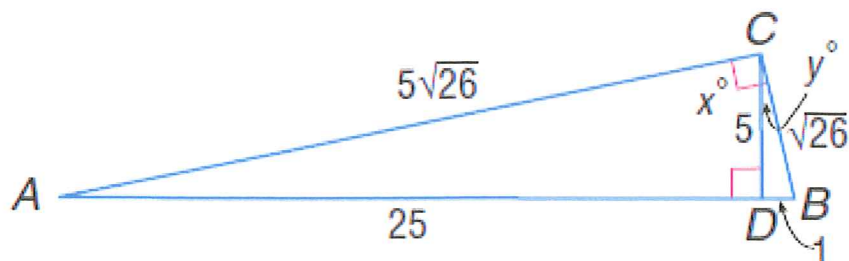
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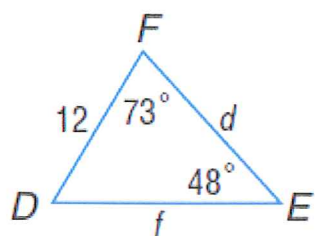
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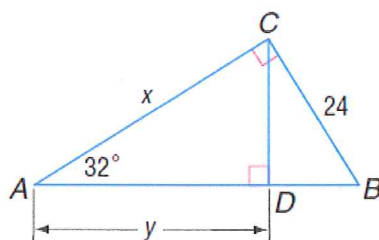
20.



21.



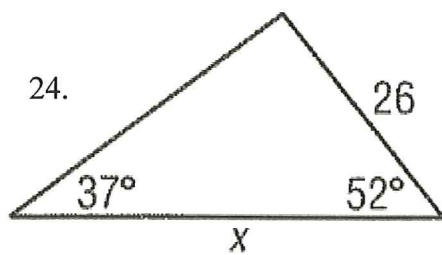
22.



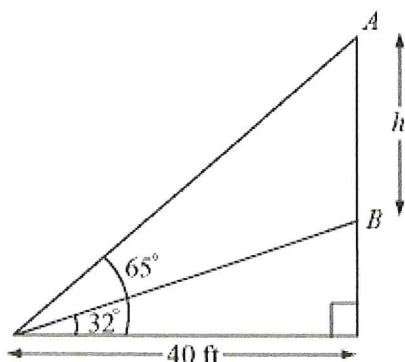
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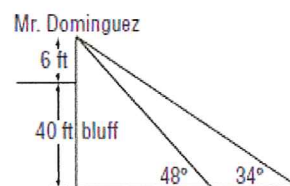
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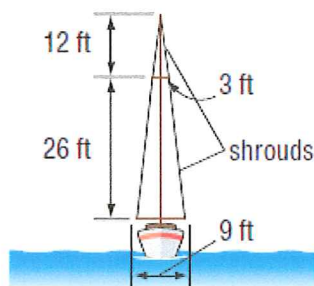


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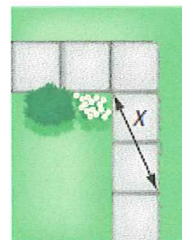


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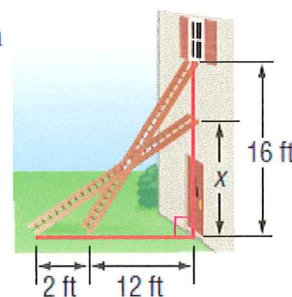
28. **SAILING** The mast of a sailboat is supported by wires called *shrouds*. What is the total length of wire needed to form these shrouds?



29. **LANDSCAPING** Six congruent square stones are arranged in an L-shaped walkway through a garden. If $x = 15$ inches, then find the area of the L-shaped walkway.



30. **PAINTING** A painter sets a ladder up to reach the bottom of a second-story window 16 feet above the ground. The base of the ladder is 12 feet from the house. While the painter mixes the paint, a neighbor's dog bumps the ladder, which moves the base 2 feet farther away from the house. How far up the side of the house does the ladder reach?



31. A tree grew at a 3° slant from the vertical. At a point 50 feet from the tree, the angle of elevation to the top of the tree is 17° . Find the length of the tree to the nearest tenth of a foot.

